California Occupational Guides

Guide for

Fuel Cell Technicians in California

May also be called: Engineering Technicians

What Would I Do?

Even though fuel cells were part of 19th century scientific exploration, it was not until the 20th century when research and development efforts increased. In the late 1950s, the National Aeronautics and Space Administration (NASA) began conducting fuel cell research and development for use in the space program. It has been only in recent times that fuel cell research and development efforts have intensified due to environmental concerns.

Fuel cells are devices that create electricity by a chemical reaction. These devices can provide power to vehicles, residential or commercial properties, medical facilities, utility plants, or portable equipment, such as radios or lighting. Fuel cells can also be used to convert methane gas from wastewater treatment plants or landfills into electricity. Most fuel cells run on hydrogen; however, some may use biofuels, ethanol, natural gas, or propane. Fuel cells offer increased efficiency while reducing environmental impacts.

Fuel Cell Technicians install, operate, and maintain integrated fuel cell systems in transportation, stationary, or portable applications. They work with engineers, scientists, or other Technicians to troubleshoot and develop corrective measures. Technicians also perform preventive and regular maintenance on vehicle fuel cell systems and fuel cell generators at business facilities. At times, they may need to communicate with customers about the installation or repair status of fuel cell systems.

Fuel Cell Technicians conduct research and development from engineering drawings, assemble test products, and test those products under the direction of an engineer or scientist. They use their knowledge of principles and theories of engineering, mathematics, and science to perform these duties. They also identify, troubleshoot, and resolve electrical, electronic, and mechanical problems. Some Technicians recommend improvements to fuel cell designs or performance. In addition, Technicians record all processes and testing results. They also may review and confirm data results.

Tools and Technology

Fuel Cell Technicians use a variety of tools in the course of their work, including computers, conductivity meters, heat exchangers, pressure indicators, voltage or current meters. They also use software, such as analytical or scientific, computer-aided design (CAD/CADD), and word processing.

Important Tasks and Related Skills

A formal survey to determine specific skills requirements for Fuel Cell Technicians has yet to be completed. Therefore, the sample skills shown below are common for the two closest occupations to

Fuel Cell Technicians: Chemical Technicians and Mechanical Engineering Technicians. Each task is matched to a sample skill required to carry out the task.

Task	Skill Used in this Task
Assemble fuel cells or fuel cell stacks according to mechanical or electrical assembly documents or schematics.	Design
Test fuel cells or fuel cell stacks, using complex electronic equipment.	Computers and Electronics
Build fuel cell prototypes, following engineering specifications.	Engineering and Technology
Calibrate equipment used for fuel cell testing.	Operation Monitoring
Collect or maintain fuel cell test data.	Writing Comprehension
Document or analyze fuel cell test data, using spreadsheets or other computer software.	Critical Thinking
Perform routine or preventive maintenance on fuel cell test equipment.	Mechanical
Report results of fuel cell tests.	Oral Expression
Conduct tests or provide technical support for tests of prototype fuel cell engines or thermal management systems.	Complex Problem Solving
Perform electrochemical performance or durability testing of solid oxide fuel cells.	Chemistry
Install, calibrate, operate, or test emissions analyzers, cell assist software, fueling systems, air conditioning systems in engine testing systems, or spark ignition (SI) or compression ignition (CI) engines.	Quality Control Analysis

Source: U.S. Department of Labor Occupational Information Network (O*NET) at onetonline.org

Working Conditions

Most Fuel Cell Technicians work in research and development laboratories. However, some may work in aeronautics or aerospace facilities, or automotive, manufacturing, or utility plants. Others may spend time traveling and working outdoors in various types of weather, maintaining or troubleshooting fuel cell installations at businesses or facilities. They may be required to lift or carry items up to 20 pounds and work in confined spaces. Technicians may be exposed to fumes, chemicals, or solvents; therefore, proper training in health and safety procedures is required, along with wearing personal protective equipment. Many Technicians work a standard 40-hour week. However, deadlines or on-call status may require Technicians to work longer hours, evenings, weekends, or holidays.

Unionization is not common in this occupation.

Will This Job Fit Me?

People who are concerned about the environment may enjoy this type of work. This occupation could be a good fit for those who like to work with ideas and activities that require an extensive amount of thinking and include practical, hands-on problems and solutions. This occupation may also interest those who have good oral and written communication abilities.

What Wages and Benefits Can I Expect?

Wages

A formal salary survey is not available; however, references to annual salaries range from $34,800 to $92,500. Hourly wages range from $16.75 to $44.47 per hour. All salaries depend on the pay structure established by each employer for work performed, the nature of the project, and the skills of the Technician. Generally, workers in large cities earn higher wages than those who work in small towns and rural areas.

Benefits

Employers may provide health and life insurance, sick leave, vacation, and retirement plans.

What is the Job Outlook?

As this is an emerging occupation, the number of Fuel Cell Technicians in California is unknown at this time. Employment opportunities should increase in the future considering society's growing interest in environmental protection and the development of alternative energy sources.

How Do I Qualify?

Education, Training, and Other Requirements

An Associate of Science degree in engineering technologies or a related field is usually the minimum educational level that employers will consider for a position as a Fuel Cell Technician. Some companies may provide entry-level Fuel Cell Technicians on-the-job training by placing them under experienced Technicians, scientists, or engineers.

Early Career Planning

High school students planning to become Fuel Cell Technicians should take courses in English, mathematics, physical and life sciences, and computer technology.

Continuing Education

While continuing education is currently not a requirement, most Fuel Cell Technicians keep up to date with the latest developments in the field to improve their skills.

Certification

Fuel Cell Technicians can receive voluntary certification from multiple professional organizations. Certification is granted to individuals who meet the minimum education and work experience requirements, and who are able to pass an examination. Certification from professional organizations can be useful for promotional reasons. For more information, go to the U.S. Department of Labor's Career InfoNet Web site at www.acinet.org and scroll down to "Career Tools." Click on "Certification Finder" at www.acinet.org/certifications_new/default.aspx and follow the instructions to locate certification programs.

Where Can I Find Training

There are two ways to search for training information at www.labormarketinfo.edd.ca.gov/?Pageid=1013:

- Search by Field of Study to find what programs are available and what schools offer those programs. You may use keywords such as: Energy Management, Systems Technology, and Technician.
- Search by Training Provider to find schools by name, type of school, or location.

Contact the schools you are interested in to learn about the classes available, tuition and fees, and any prerequisite course work.

Where Would I Work?

The largest industries employing Fuel Cell Technicians in California are as follows:

Industry Title	*Percent of Estimated Employment in California*
Manufacturing	28%
Government	24%
Professional, Scientific, and Technical Services	19%

Source: U.S. Department of Labor Occupational Information Network (O*NET) at online.onetcenter.org

Finding a Job

Direct contact with employers is a traditional means to finding a job as a Fuel Cell Technician. Jobs may also be found through college placement offices, job fairs, or online job boards. **Online job opening systems** include JobCentral at www.jobcentral.com and CalJOBS℠ at www.caljobs.ca.gov.

To find your nearest One-Stop Career Center, go to Service Locator. View the helpful job search tips for more resources. (requires Adobe Reader).

Yellow Page Headings

You can focus your local job search by checking employers listed online or in your local telephone directory. Below are some suggested headings where you might find employers of Fuel Cell Technician.

- Engineering Technician
- Fuel Cell Engineering Technician

Find Possible Employers

To locate a list of employers in your area, use “Find Employers” on the LaborMarketInfo Web site at http://www.labormarketinfo.edd.ca.gov/aspdotnet/databrowsing/empMain.aspx?menuChoice=emp

- Select the search for employers by occupation.
- Select a geographic area.
- Search for an occupation by keyword, occupation, or category.
- Select one of the top industries that employ the occupation.
- This will give you a list of employers in that industry in your area.
- Click on “View Filter Selections” to limit your list to specific cities or employer size.

- Click on an employer for the street address, telephone number, size of business, Web site, etc.
- Contact the employer for possible employment.

Where Could This Job Lead?

With increasing experience and skills, Fuel Cell Technicians may have opportunities for advancement to better-paying senior technical positions.

Related Occupations

Below is a list of occupations related to Fuel Cell Technicians (O*NET code in parentheses).

- Chemical Technicians (19-4031)
- Electronics Engineering Technicians (17-3023.01)
- Engineering Technicians, Except Drafters, All Other (17-3029)
- Mechanical Engineering Technicians (17-3027)
- Mechanical Engineering Technologists (17-3029.07)
- Chemical Engineers (17-2041)
- Fuel Cell Engineers (17-2141.01)
- Mechanical Engineers (17-2141) Guide

Other Sources

- California Energy Commission
  www.energy.ca.gov
- California Fuel Cell Partnership (CaFCP)
  www.fuelcellpartnership.org
- California Stationary Fuel Cell Collaborative
  www.casfcc.org
- National Fuel Cell Research Center
  www.nfcrc.uci.edu
- National Energy Technology Laboratory (NETL)
  www.netl.doe.gov
- U.S. Department of Energy (DOE)
  www.energy.gov
- U.S. DOE Argonne National Laboratory
  www.transportation.anl.gov
- U.S. DOE Energy Efficiency and Renewable Energy
  www.eere.energy.gov
- U.S. DOE Hydrogen Program
  www.hydrogen.energy.gov
- Advanced Transportation Technology and Energy
  www.attecolleges.org
- Fuel Cell and Hydrogen Energy Association
  www.fchea.org
- Fuel Cells 2000
  www.fuelcells.org

These links are provided for your convenience and do not constitute an endorsement by EDD.

For the Career Professional

The following codes are provided to assist counselors, job placement workers, or other career professionals.

System	Code
SOC – Standard Occupational Classification	17-3029.10
O*NET – Occupational Information Network Interest Codes (RIASEC)	RI

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